

Claims

1. A method for accessing a data segment recorded on a track on a data storage disc in a disc drive, the disc having one or more tracks with a plurality of sequentially arranged data sectors accessible by a read/write head, the method comprising steps of:

- 5 (a) accessing a target sector of the data segment and reading data stored on the target sector via the read/write head;
- (b) accessing each additional sector of the data segment in ascending order from the target sector and reading data stored on each additional sector via the read/write head;
- (c) generating an instruction list such that the instruction list identifies each sector
10 of the data segment on which an error is encountered; and
- (d) executing a read error recovery procedure enabling data from each sector on which an error was encountered to be accessed during a single revolution of the disc as the disc is accessed by the read/write head.

15 2. A method as defined in claim 1, wherein the executing step (d) comprises steps of:

- (d)(i) accessing a recovery target sector and reading data stored on the recovery target sector via the read/write head, the recovery target sector being the sector of the data segment on which an error was first encountered during data segment access by the read/write head; and
- (d)(ii) during the read error recovery procedure, accessing one or more remaining sectors of the data segment on which an error was encountered during data segment access by the read/write head, the one or more remaining sectors being identified by the instruction list.

25 3. A method as defined in claim 2, wherein the disc drive further includes a data buffer having buffer sectors therein and a formatter operatively connected to the data buffer and the read/write head, the formatter being operable for regulating a transfer of data between data sectors on the track and buffer sectors in the buffer, wherein the instruction list is operable for instructing the formatter to allow the transfer of data between the buffer sectors
30 and the sectors on the disc storing the data segment on which an error is encountered during access by the read/write head and for instructing the formatter not to transfer data between

buffer sectors and the sectors on the disc storing the data segment on the track on which an error is not encountered during access by the read/write head.

4. A method as defined in claim 3, wherein the disc drive further includes a skip mask operably connected to the formatter and operable to hold the instruction list.

5. A method as defined in claim 4, wherein the disc drive further includes a microprocessor and a vector buffer manager list which indicates an order in which the buffer may be accessed.

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6. A method as defined in claim 5 further comprising a step of:

(e) updating the vector buffer manager list to direct the transfer of data from each sector of the data segment on which an error is encountered to a corresponding sector in the buffer during the read error recovery procedure.

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7. A method as defined in claim 2, wherein the executing step (d) further comprises a step of:

(d)(iii) updating the instruction list to identify each sector on which an error is encountered during the single revolution of the disc.

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8. A method as defined in claim 7 further comprising a step of:

(e) if an error is encountered during the read error recovery procedure, repeating the executing step (d) until each sector of the data segment is read from the disc

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9. A method as defined in claim 3, wherein the disc drive further includes a data throttling mechanism operably connected between the buffer and a host computer, the data throttling mechanism being operable to regulate a transfer of data between the buffer and the host computer and having a data throttling register, the method further comprising a step of:

(e) incrementing the data throttling register by one count at each sector access during the single revolution if an error has not occurred while the data segment is accessed from a target sector.

10. A method as defined in claim 9 further comprising a step of:
(f) enabling the transfer of data stored from the buffer to the host computer if the count of the data throttling register is equal to a non-zero number.
- 5 11. A method as defined in claim 9 further comprising a step of:
(f) pausing the transfer of data from the buffer to the host computer if the count of the data throttling register is equal to zero.
- 10 12. A method as defined in claim 1, wherein the accessing step (b) is terminated as the read/write head accesses a final sector of the data segment.
- 15 13. A method as defined in claim 1, wherein the accessing step (b) is terminated as the read/write head accesses a single revolution of the track.
14. A method as defined in claim 1, wherein the data segment includes audio/visual data.

15. In a disc drive having a data storage disc having one or more tracks thereon with a plurality of sequentially arranged data sectors accessible by a read/write head, a method for reading data in a data segment on the disc comprising steps of:

- (a) performing an initial read of the data segment during a first access of the track
5 wherein a plurality of errors may be encountered on a plurality of sectors of the data segment as the data segment is being initially read; and
(b) during a single revolution of the track and a subsequent access of the data segment, performing a re-read of the data recorded on each sector of the data segment on which an error was encountered.

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16. A method as defined in claim 15 wherein the performing step (a) comprises:

- (a) (i) accessing a target sector of the data segment and reading data stored on the target sector via the read/write head;
15 (a) (ii) accessing each additional sector of the data segment in ascending order from the target sector and reading data stored on each additional sector via the read/write head; and
(a) (iii) generating an instruction list such that the instruction list identifies each sector of the data segment on which an error is encountered.

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17. A method as defined in claim 16, wherein the performing step (b) comprises:

- (b)(i) accessing a recovery target sector and reading data stored on the recovery target sector via the read/write head, the recovery target sector being identified by the instruction list as the sector on which an error was first encountered during the first access by the read/write head; and
25 (b)(ii) during the subsequent access of the track, accessing one or more remaining sectors of the data segment on which an error was encountered during the first access by the read/write head, the one or more remaining sectors being identified by the instruction list.

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18. A method as defined in claim 17, wherein the disc drive further includes a data buffer having buffer sectors therein and a formatter operatively connected to the data buffer and the read/write head, the formatter being operable for regulating a transfer of data between data sectors on the track and buffer sectors in the buffer, wherein the instruction list is operable for instructing the formatter to allow the transfer of data between the buffer sectors

and the sectors on the disc storing the data segment on which an error is encountered during the first and the subsequent access of the track and for instructing the formatter not to transfer data between buffer sectors and the sectors on the disc storing the data segment on the track on which an error is not encountered during the first and the subsequent access of the track.

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19. A method as defined in claim 18, wherein the disc drive further includes a skip mask operably connected to the formatter and operable to hold the instruction list, a microprocessor and a vector buffer manager list which indicates the order in which the buffer may be accessed.

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20. A method as defined in claim 15 further comprising a step of:

(c) if one or more errors are encountered during the re-read, repeating the performing step (b) until data from each of the one or more sectors is properly read from the disc.

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21. A system for re-reading data sectors of a data segment recorded on a track on a data storage disc, the system comprising:

a formatter regulating a transfer of data between data sectors on the track accessed by a transducer and buffer sectors in a buffer; and

5 control means for identifying each sector of the data segment to be read by the transducer, the control means identifying the sectors on which an error was encountered during a previous access of the track.

22. A system as defined in claim 21, wherein the control means comprises:

10 a skip mask operably connected to the formatter and operable to hold an instruction list, the instruction list being operable for instructing the formatter to allow the transfer of data between the buffer sectors and the sectors on the disc storing the data segment on which an error is encountered during the first and the subsequent access of the track and for instructing the formatter not to transfer data between buffer sectors and the sectors on the disc storing the data segment on the track on which an error is not encountered during the first and the subsequent access of the track.

15 23. A system as defined in claim 22 further comprising:

20 a vector buffer manager list indicating an order in which the buffer may be accessed.

24. A system as defined in claim 21 further comprising:

a data throttling mechanism operably connected between the buffer and a host computer, the data throttling mechanism being operable to regulate a transfer of data between the buffer and the host computer.

25 25. A system as defined in claim 21, wherein the data segment includes audio/visual data.

26. A disc drive having a data storage disc, an actuator for positioning a transducer over the data storage disc and a disc controller for communicating with a host computer, controlling position of the actuator and controlling access to sequentially arranged data sectors on tracks on the data storage disc, the disc drive comprising:

- 5 a buffer having sequentially arranged buffer sectors;
- a read/write channel receiving data retrieved from the disc by the transducer;
- an interface between the read/write channel and the buffer, the interface transmitting data read through the read/write channel to the buffer sectors of the buffer;
- a formatter between the interface and the read/write channel for timing when data is transferred between the interface and the read/write channel;
- 10 a buffer manager building and updating a vector buffer manager list which indicates an order in which the buffer may be accessed; and
- 15 a skip mask mechanism operably connected to the formatter providing an instruction list directing the formatter whether to enable a passage of data between the interface and the read/write channel for each sequentially accessed sector on a data segment being read pursuant to a read command from the host computer.

27. A disc drive as defined in claim 26 further comprising:

- 20 a data throttling mechanism operably connected between the buffer and the host computer, the data throttling mechanism being operable to regulate a transfer of data between the buffer and the host computer.

28. A disc drive as defined in claim 27 wherein the data throttling mechanism comprises a data throttling register, the data throttling mechanism enabling the transfer of data from the buffer to the host computer if the count of the data throttling register is equal to a non-zero number.

29. A disc drive as defined in claim 27 wherein the data throttling mechanism comprises a data throttling register, the data throttling mechanism pausing the transfer of data from the buffer to the host computer if the count of the data throttling register is equal to zero.

30. A disc drive as defined in claim 26 wherein the skip mask mechanism controls a read error recovery procedure re-reading data stored on one or more disc sectors as the transducer accesses the data segment during a single revolution of the disc following an initial access of the data segment during which an error was encountered on the one or more disc sectors.

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